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| Student Name: _____ | Grade: _____ |
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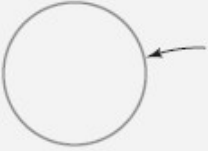

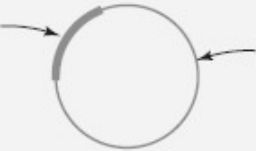

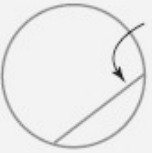
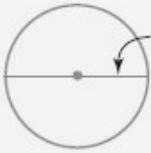

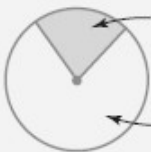
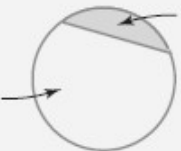

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1 Year 8 Term 4 Week 1 Homework

1.1 Circles and Cylinders

1.1.1 Parts of the circle

The following table shows the various parts of a circle and lists their definitions.

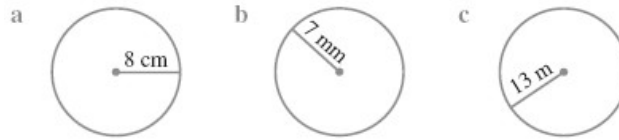
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|--|--|
|  <p>Circumference: the boundary of a circle.</p> |  <p>Semicircle: half the boundary of a circle.</p> |
|  <p>Arc: part of the circumference. The smaller arc is called the minor arc and the larger arc is called the major arc.</p> |  <p>Centre: the point inside a circle that is equidistant from all points on the circumference.</p> |
|  <p>Chord: an interval that joins two points on the circumference.</p> |  <p>Diameter: a chord that passes through the centre.</p> |
|  <p>Radius: an interval that joins the centre to a point on the circumference. It is half the length of the diameter.</p> |  <p>Sector: the area bounded by an arc and two radii. The smaller sector is called the minor sector and the larger sector is called the major sector.</p> |
|  <p>Segment: the area bounded by an arc and a chord. The smaller segment is called the minor segment and the larger segment is called the major segment.</p> |  <p>Tangent: a line that touches a circle at one point.</p> |

1.1.2 Circumference of a circle

The circumference C of a circle is given by: $C = \pi d$ or $C = 2\pi r$

where d is the length of the diameter and r is the length of the radius.

Exercise 1.1.1 Find the circumference of each circle, correct to 1 decimal place, using $C = 2\pi r$.

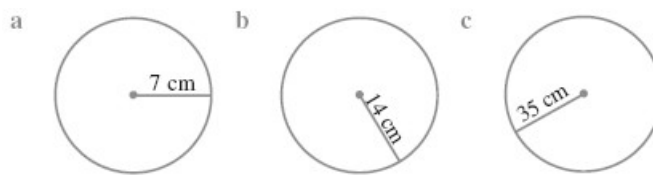


a $C =$ _____

b $C =$ _____

c $C =$ _____

Exercise 1.1.2 Find the circumference of each circle by taking $\pi = \frac{22}{7}$.



a $C =$ _____

b $C =$ _____

c $C =$ _____

Exercise 1.1.3 Find in terms of π the exact circumference of a circle with:

1. diameter 6 cm _____

2. radius 9 cm _____

3. radius 12.5 cm _____

1.1.3 Applications of circumference

Exercise 1.1.4 Find correct to 1 decimal place, the length of the radius in a circle whose circumference is:

1. 72.3 cm _____
2. 106.8 cm _____
3. $25 \pi \text{ cm}$ _____

Exercise 1.1.5 Find the length of the diameter in a circle whose circumference is:

1. 138.2 m _____
2. 100.6 m _____
3. $14 \pi \text{ m}$ _____

Exercise 1.1.6 Further applications

1. *The radius of the Earth is approximately 6400 km. Calculate the distance around the Earth at the equator, correct to the nearest kilometre.*

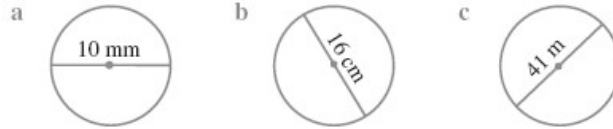
2. *A 20 cent coin has a diameter of 28.52 cm. If the coin rolled through 20 complete revolutions, what distance will it travel? Answer correct to the nearest mm.*

3. *The circumference of the front wheel of a car is 2.52 m. How many complete revolutions will the wheel make if the car travels a distance of 60 km?*

1.1.4 Area of a circle

The area of a circle is given by : $A = \pi r^2$ where r is the length of the radius.

Exercise 1.1.7 Find the area of each circle, correct to 1 decimal place:



a Area = _____

b Area = _____

c Area = _____

Exercise 1.1.8 Find correct to 2 decimal places, the area of a circle with:

1. radius 18 cm

2. a radius 35 cm

3. a diameter 25 cm

Exercise 1.1.9 Find in term of π the exact area of a circle with:

1. radius 12 cm _____

2. radius 15 cm _____

3. diameter 18 cm _____

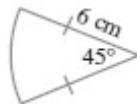
1.1.5 Area of a sector

If the angle in the sector is θ degrees, then the fraction of the circle occupied by the sector is $\frac{\theta}{360}$. Therefore the area of a sector is given by:

$$A = \pi r^2 \times \frac{\theta}{360}$$

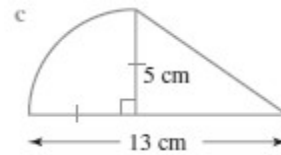
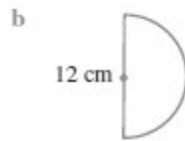
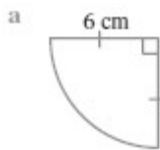
Example 1.1.1 Find the area of the sector, correct to 1 decimal place.

Solution:



$$\begin{aligned} A &= \pi r^2 \times \frac{\theta}{360} \\ &= \pi \times 6^2 \times \frac{45}{360} \\ &= 14.1 \text{ cm}^2 \text{ (to 1 decimal place)} \end{aligned}$$

Exercise 1.1.10 Find the area of each figure, correct to 1 decimal place:



a Area = _____

b Area = _____

c Area = _____

1.2 Miscellaneous Exercise

Exercise 1.2.1

1. John buys two drinks and one ice-cream for \$7.00. Ken buys one drink and two ice-creams for \$8.00. Martin buys two drinks and two ice-creams. How much will this cost Martin?

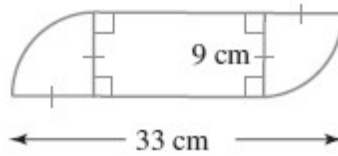
2. Mary won \$5400 in a lottery prize. She decided to put half of it in the bank and used two thirds of the remainder to pay off her credit card debt. How much does she have left?

3. Expand and simplify this expression: $3(x - 4) - 2(2x - 5)$.

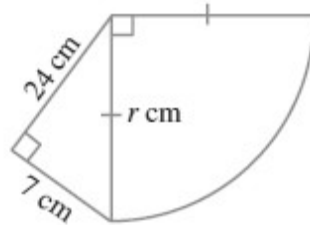
4. From her fortnightly pay, Emma spent 36% on groceries, 10% on petrol, 12% on a dress and 18% on her electricity bill. If she had \$336 remaining, what amount had she spent on groceries?

5. A bushwalker leaves A and walks 4 km in a northerly direction then 6 km in an easterly direction. How far is he from A (to the nearest metre)?

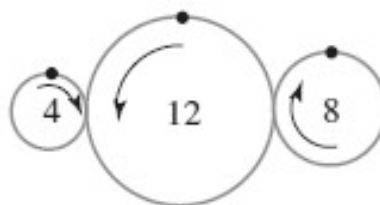
6. Find the total area of the following figure, correct to 1 decimal place.



7. Find the value of r and hence calculate the total area of the figure, correct to 1 decimal place.



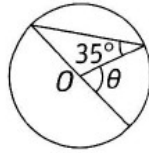
8. In a system of 3 gear wheels, the first wheel has 4 teeth, the second has 12 teeth, and the third has 8. How many revolutions will the smallest wheel have to make before all wheels are back to their starting positions?



1.3 Maths Challenge

Exercise 1.3.1

1. O is the centre of the circle. Find the size of angle θ .



2. A set of scales for weighing pumpkins is shown in the diagram below. William has a set of 3 weights, 1 kg, 4 kg and 7 kg. Using these weights, what is the lightest pumpkin which **cannot** be weighed if all pumpkins weigh a whole number of kilograms?



- A. 2 kg B. 3 kg C. 5 kg D. 8 kg E. 9 kg

3. A 1×1 square is made using 4 matches and a 2×2 square, with all the unit square inside, uses 12 matches as shown below. Find the number of matches needed to construct a 20×20 square with all the unit square inside.